

# Confirmation of the presence of *Geyeria uruguayana* (Burmeister, 1880) in Paraguay, with notes (Lepidoptera: Castniidae)

J. M. González, S. D. Ríos & P. Smith

## Abstract

Two Paraguayan localities expand the known distribution of *Geyeria uruguayana*, and confirm the species presence in the country. Notes on taxonomic history, distribution, biology and ecology of the species are included.

KEY WORDS: Lepidoptera, Castniidae, *Geyeria uruguayana*, distribution, Paraguay.

## Confirmación de la presencia de *Geyeria uruguayana* (Burmeister, 1880) en Paraguay, con notas (Lepidoptera: Castniidae)

## Resumen

Dos localidades de Paraguay amplían la distribución conocida de *Geyeria uruguayana*, permitiendo confirmar la presencia de esta especie en dicho país. Se presentan, además, notas sobre la historia taxonómica, distribución, biología y ecología de la especie.

PALABRAS CLAVE: Lepidoptera, Castniidae, *Geyeria uruguayana*, distribución, Paraguay.

## Introduction

Information about the Castniidae of Paraguay was scarce and scattered until RÍOS & GONZÁLEZ (2011) published a synopsis of the Giant Butterfly-moths known from the country. Twelve species were reported as present in Paraguay, four of which are well known and have been frequently cited in the literature (RÍOS & GONZÁLEZ, 2011; SCHADE, 1925, 1926, 1927, 1930; JÖRGENSEN, 1930). The other eight species listed are known from few specimens. The authors listed four additional species which they considered of probable occurrence in Paraguay.

In this contribution, we confirm the presence in Paraguay of one of these four probable species, *Geyeria uruguayana* (Burmeister, 1880) (RÍOS & GONZÁLEZ, 2011). The confirmation is based on two records: 1) a specimen collected in Laguna Blanca Natural Reserve, San Pedro Department, which is deposited in the Para La Tierra Zoological Collection; and 2) an uncollected (but photographed) specimen from Teniente Enciso National Park, Boquerón Department, in the Paraguayan Chaco.

*Geyeria uruguayana* is poorly represented in collections. Specimen records exist from Argentina, Uruguay, and Southeastern Brazil (MILLER, 1986; PENCO, 2011; PREISS 1899; RÍOS & GÓNZALEZ, 2011), but few specimens are available from each collecting locality. The new records reported here expand the geographical distribution of the species to Paraguay. Further details on the species, collecting sites, and collections where they are to be found are presented herein.

## Taxonomic history

*Geyeria uruguayana* (Burmeister, 1880)

*Castnia uruguayana* Burmeister, 1880

*Castnia uruguayana* f. *separatula* Strand, 1913

*Castnia uruguayana cinerascens* Houlbert, 1917

*Castnia uruguayana* f. *badariottii* Raymundo, 1919

*Castnia uruguayana ochreifascia* Joicey & Talbot, 1925

*Castnia uruguayana champaquiensis* Breyer, 1929

*Castnia uruguayana rubra* Raymundo, 1931

*Castnia uruguayana strandi* Raymundo, 1931, nom. nud.

*Geyeria uruguayana* var. *badariotti* Miller, 1995, missp.

*Geyeria uruguayana ochreifascia* Miller, 1995, missp.

The species was originally described as *Castnia uruguayana* by BURMEISTER (1880) from material collected in Paysandú, “Banda Oriental”, Uruguay. STRAND (1913) maintained all Neotropical Castniidae in the genus *Castnia* s.l. and named form *separatula* based on a slightly atypical *C. uruguayana* male of unknown origin. HOULBERT (1917) describes the ssp. *cinerascens* from material collected in the Eastern Bank of the Uruguay River (Banda Oriental, Uruguay). HOULBERT (1918) included the species *decussata* Godart, *strigata* Walker, *hubneri* Gray and *uruguayana* within his new genus *Ypanema*. This genus was later synonymized with *Geyeria* which was originally proposed by Heinrich Buchecker to include the species *decussata*, *discoidalis* Buchecker (= *G. decussata*) and *castnioides* Buchecker (= *G. hubneri*) (BUCHECKER, [1880]; FLETCHER & NYE, 1982; OITICICA, 1955). RAYMUNDO (1919) described the form *badariottii* based on material collected in Minas Gerais, Brazil. Later, after studying a female collected in Mato Grosso, Brazil, the subspecies *ochreifascia* was also described (JOICEY & TALBOT, 1925). BREYER (1929) citing “notable differences” with “typical” specimens of *G. uruguayana* from Uruguay, put forth the ssp. *champaquiensis* based on material collected in Córdoba, Argentina. MILLER (1986, 1995) recognized three subspecies (*uruguayana*, *champaquiensis* and *ochreifascia*[sic]) in *Geyeria uruguayana*. However, they were all later synonymized under *uruguayana* by LAMAS (1995).

## Material examined

Data presented as written in the labels of each specimen examined. Additional information is included within square brackets. ARGENTINA: 1 ♂, *Cast.[nia] uruguayana* Burm, 20 Argentina, Joicey Bequest. Brit.[ish] Mus.[eum] 1934-120 (BMNH); 2 ♂♂, 1 ♀, Goya, [Argentina], Coll. ? (BMNH); 1 ♂, Argentina, Córdoba, R. Foerster leg. (CMZ); 1 ♀, Typus, *Castnia uruguayana champaquiensis*, Yacanto, Córdoba, Argentina, Cerro Champaquí, Sierras de Córdoba, 2400 m. I-1929, Coll. A. Breyer (MLP) [this specimen is the one illustrated by BREYER (1929)]; 1 ♀, Formosa, Gran Guardia, [Argentina], 11-III-1953, Col. J. Foerster (MLP); 1 ♂, Formosa, Gran Guardia, [Argentina], Col. ?? (MLP); BRAZIL: 1 ♀, Holotype, *C.[astnia] uruguayana ochreifascia* J. & T., Matto Grosso, Brazil, Ex-Coll. Herbert Druce, Joicey Bequest. Brit.[ish] Mus.[eum] 1934-120 (BMNH); 1 ♀, Neotipo, *Castnia uruguayana* Burm. f. *badariottii* Benedito Raymundo, Juiz de Fora, M[inas] G[erais], [Brazil], Coll. B. Raymundo, leg. (MNRJ) [this specimen is illustrated in MIELKE & CASAGRANDE (1986); it was designated Neotype because the specimen originally described by RAYMUNDO (1919; 1930) was not found]; 1 ♂, [São José de] Bôa Vista - Tibagi PR[Paraná], Brazil, 1000 m., 12-V-2005 (RVC); 8 ♂♂, 3 ♀♀, [São José de] Bôa Vista - Tibagi, 1000 - 1100 m, Paraná, Brazil, XII-1971, Coll. ? (NC); 1 ♂, “30 km L Tibagi - 1050 m”, Paraná, Brazil, 14-XII-2008. Coll. O. & C. Mielke (DZUP); PARAGUAY: 1 ♂, Reserva Natural Laguna Blanca, Departamento de San Pedro, Paraguay, 31-X-2010, Coll. K. Atkinson (CZPLT-E) [this specimen constitutes the first record of the species for Paraguay]; URUGUAY: 2 ♂♂, Paysandú, [Uruguay],

Uruguayana, reçu de M. J. Petit, en Xbre, [October?], 1919 (BMNH); 1 ♂, *Castnia uruguayana* Burmeister, *Cast.[nia] uruguayana* var. *cinerascens* Houlb., Rep. Argentina, Banda Oriental, [Uruguay] ["Banda Oriental of Argentine" was the name of the region that corresponds with what we know today as Uruguay], coll. E. Kinkelin, ex-Collection Ch. Oberthür (type of *Castnia uruguayana* var. *cinerascens* Houlbert, 1918) (BMNH) [this specimen is illustrated in HOULBERT (1918)]; 2 ♂♂, Uruguay, Paysandú, I-1930, Col. ?? (MLP); 1 ♀, 111. Uruguay, Rschiv.[?] (BMNH); 1 ♂, Uruguay, 549, Strecker Colln. 25664, genitalia vial no. M-3788, Jacqueline Miller (FMNH); 1 ♂, Uruguay, 985, Strecker Colln. 25665 (FMNH); 1 ♂, *Castnia uruguaiana*[sic] Bium.[sic], Col. F. Bourquin, Rep. Argentina, Paysandú, [Uruguay]. Slide N° M-7135, ♂ append. Jacqueline Y. Miller (MGCL); 1 ♀, *Castnia uruguayana* Burm., Col. F. Bourquin, Rep. Argentina, Paysandú, [Uruguay], I-30 (MGCL) [These last two specimens have an original Fernando Bourquin label which has "Rep. Argentina" typed below the collector's name, however the specimens were actually collected in Paysandú, Uruguay which is handwritten by F. Bourquin]; 2 ♂♂, Uruguay, Paysandú, Col. Breyer (MLP); 1 ♂, Uruguay, Paysandú, Col. F. Bourquin (MLP).

Codens of Museums or collections where *G. uruguayana* were found, studied and mentioned here are as follows: BMNH, Natural History Museum, London, U.K.; CMZ, Mateo Zelig Collection, Entre Ríos, Argentina; CZPLT-E, Colección Zoológica de Para La Tierra - Entomology, Laguna Blanca, Paraguay; DZUP, Departamento de Zoología, Universidade Federal do Paraná, Curitiba, Paraná, Brazil; FMNH, Field Museum of Natural History, Chicago, Illinois, USA; MGCL, McGuire Center for Lepidoptera & Biodiversity, Gainesville, Florida, USA; MLP, Museo de La Plata, Buenos Aires, Argentina; MNRJ, Museu Nacional, Rio de Janeiro, Brazil; RVC, Roberto Vinciguerra Collection, Palermo, Italy. NC corresponds to a private collection that we are unable to disclose.

### Biology and behavior

It has been previously stated that the flight pattern of this species is "slow and hovering" which is atypical of most Castniidae specimens have also been observed in grassy spots posing with their wings closed (MILLER, 1986, RÍOS & GONZÁLEZ, 2011). Individuals have been observed flying during mid-day, but can also fly at different times of the day if disturbed (MILLER, 1986). BIEZANKO *et al.* (1957) state that the larvae feed on *Eryngium paniculatum* Cav. & Dombey ex F. Delaroché (Apiaceae). PENCO (2011) and PASTRANA (2004), corroborate this, adding that Palms (Arecaceae) are another likely hosts of this borer.

### Paraguayan records and distribution

The first record from Paraguay is a specimen (Fig. 1) collected on October 31, 2010, in Laguna Blanca Natural Reserve (S 23° 48' 45", W 56° 17' 41"), San Pedro Department, during the ongoing Lepidoptera inventory at the Para La Tierra Ecological Station (PLT). The vegetation here consists of a mosaic of cerrado and degraded patches of Atlantic forest interspersed with semi-deciduous transitional humid-dry gallery forest. (GUYRA PARAGUAY, 2008). The four cerrado "ecotopes" described by EITEN (1972, 1978) are all present within the reserve. Unfortunately, the specimen lacks any ecological notes associated with it.

A second *Geyeria uruguayana* specimen was observed by one of the authors (PS) in Teniente Enciso National Park (S 21° 12' 40", W 61° 39' 21"), Boquerón Department on February 9, 2012. Due to permit restrictions the specimen was photographed but not collected (Fig. 2). The vegetation at this locality consists of low, Dry Chaco thorn forest with a canopy no more than 2.5m high, broken by occasional much larger trees [e.g. quebracho: *Aspidosperma* (Apocynaceae) and *Schinopsis* (Anacardiaceae)] and with a bromeliad (Bromeliaceae) and cacti (Cactaceae) undergrowth. The moth was located on a path through the forest that was lined at either side by a low-growing, moss-like fern. Its flight behavior was notable, with short, erratic flights recalling a

hesperiid that revealed eye-catching glimpses of the orange hindwing and the insect frequently doubled back to retrace the same route. The moth perched on the ground for fairly long periods between flights, with wings folded over the body, but it was not observed feeding (Fig. 2).

Despite the wide geographical distribution of *Geyeria uruguayana*, precise locality data are limited. Existing specimens do however reveal its presence in a wide diversity of mainly open habitats in southeastern South America (Fig 3). The most northerly record is from an unknown location in the Matto Grosso region, while the easternmost is located around an unspecified site in Minas Gerais, both in Brazil. The Type specimen was collected in Paysandú, close to the most southerly record from Argentina. The two additional localities reported here from Paraguay confirm that the species is more widely distributed than previously thought, and the distance between these two localities is suggestive of a much wider distribution within the country. Furthermore, since the Teniente Enciso record is geographically close to the Bolivian border, and with a similar habitat to that region it seems probable that the species also occurs in Bolivia.

As Paraguay has suffered some of the heaviest environmental intervention in the region and Castniidae are known to be particularly sensitive to habitat destruction (GONZÁLEZ, 2004; LAMAS, 1993; RÍOS & GONZÁLEZ, 2011; VINCIGUERRA et al., 2011), detailed collecting studies are needed in order to clearly establish the real distribution and status of the species. Until these data are available, an effective conservation program cannot be proposed.

### Acknowledgements

We are indebted to Karina Atkinson (PLT), James Boone (FMNH), Fernando Dias (DZUP), Marcelo Duarte (Museu de Zoologia, Universidade de São Paulo-MZUSP), Alessandro Giusti (NHM-London), Andrea C. González (University of Georgia), Olaf Mielke (DZUP), Jacqueline Y. Miller (MGCL), Victor Sarto Monteys, Simeão Souza Moraes (MZUSP), Fernando Penco, Gerardo Lamas (Museo de Historia Natural, Universidad Nacional Mayor de San Marcos), Thierry Porion, Roberto Vinciguerra, S. Bradleigh Vinson (Texas A & M University), and Mateo Zelig (CMZ), who kindly contributed with comments, data, information and/or facilitating access to the specimens under their care. Special thanks go to Bolívar Garcete (DZUP), for helping us with the distribution map.

### BIBLIOGRAPHY

- BIEZANKO, C. M., RUFFINELLI, A. & CARBONELL, C. S., 1957.– Lepidoptera del Uruguay. Lista anotada de especies.– *Revista de la Facultad de Agronomía. Universidad de la República (Montevideo)*, **46**: 1-152.
- BREYER, A., 1929.– Un nuevo Castniidae argentino. *Castnia uruguayana champaquiensis* nov. ssp.– *Revista de la Sociedad Entomológica Argentina*, **2**(6): 333-334.
- BURMEISTER, H., 1880.– *Atlas de la description physique de la République Argentine contenant des vues pittoresques et des figures d'Histoire naturelle. 2<sup>e</sup> Livraison. Lépidoptères*: 41-64 pp. Imprimerie de P.E. Coni, Paris; F. Savy, Halle; E. Anton, Buenos Aires.
- BUCHECKER, H., [1880].– *Systema entomologiae sistens insectorum Classes, Genera, Species. Pars 6*: 2 + 30 pls. Author, München.
- EITEN, G. 1972.– The cerrado vegetation of Brazil.– *Botanical Review*, **38**: 201-341.
- EITEN, G. 1978.– Delimitation of the cerrado concept.– *Vegetatio*, **36**: 169-178.
- FLETCHER, D. S. & NYE, I. W. B., 1982.– *The generic names of moths of the world. Castnioidea*, **4**: 192 pp. British Museum (Natural History), London.
- GONZÁLEZ, J. M., 2004.– Castniinae (Lepidoptera: Castniidae) from Venezuela. VI: The genus *Athis*. Diagnosis and comments.– *Caribbean Journal of Science*, **40**(3): 408-413.
- GUYRA PARAGUAY, 2008.– *Áreas Importantes para la Conservación de las Aves del Paraguay*: 470 pp. Guyra Paraguay, Asunción.
- HOULBERT, C., 1918.– Révision monographique de la sous-famille des Castniinae.– *Études de Lépidoptérologie Comparée*, **15**: 1-730.

- JÖRGENSEN, P., 1930.– Los Castniidae de la Argentina y Paraguay.– *Revista de la Sociedad Entomológica Argentina*, **14**: 175-180.
- JOICEY, J. J. & TALBOT, G., 1925.– Notes on some Lepidoptera with descriptions of new forms.– *Annals and Magazine of Natural History*, (9)**16**(96): 633-653.
- LAMAS, G., 1993.– Bibliografía de los Castniidae (Lepidoptera) americanos. *Revista Peruana de Entomología*, **35**: 13-23.
- LAMAS, G., 1995.– A critical review of J. Y. Miller's checklist of the Neotropical Castniidae (Lepidoptera).– *Revista Peruana de Entomología*, **37**: 73-87.
- MIELKE, H. H. & CASAGRANDE, M. M., 1986.– Sobre os tipos de Lepidoptera depositados em Museus Brasileiros. VI. Castniidae, Cossidae, Sphingidae e Noctuidae, descritos por Benedicto Raymundo [Da Silva].– *Revista Brasileira de Entomologia*, **30**(2): 245-249.
- MILLER, J. Y., 1986.– *The Taxonomy, Phylogeny, and Zoogeography of the Neotropical Castniinae (Lepidoptera: Castnioidea: Castniidae)*: 571 pp. Ph.D. Thesis. University of Florida, Gainesville.
- MILLER, J. Y., 1995.– Castniidae. In: J. B. HEPPNER (ed.).– *Checklist: Part 2. Hyblaeoidea-Pyraloidea-Tortricioidea*.– *Atlas of Neotropical Lepidoptera*, 3: 133-137, 176-177. Association for Tropical Lepidoptera / Scientific Publishers, Gainesville.
- OITICICA FILHO, J., 1955.– Revisão dos nomes genéricos sul-americanos da subfamília Castniinae (Lepidoptera: Castniidae).– *Revista Brasileira de Entomologia*, **3**:137-167.
- PASTRANA, J., 2004.– *Los Lepidópteros Argentinos. Sus plantas hospedadoras y otros sustratos alimenticios, distribución geográfica y actualización sistemática*: 334 pp. Sociedad Entomológica Argentina, Buenos Aires.
- PENCO, F. C., 2011.– *Lepidoptera Argentina. Catálogo ilustrado y comentado de las mariposas de Argentina. Parte I; Castniidae*: 41 pp. Author, Morón.
- PREISS, P., 1899.– *Neue und seltene Arten des Lepidopteren-Genus Castnia*: 11 pp. Author, Ludwigshafen a/Rhein.
- RAYMUNDO, B., 1919.– Dois Lepidopteros novos de Brasil.– *Boletín de la Sociedad Entomológica de España*, **2**(7-8): 159-160.
- RAYMUNDO, B., 1930.– Nomenclatura popular dos Lepidopteros do Distrito Federal e seus arredores.– *O Campo (Rio de Janeiro)*, **2**(6): 46-48.
- RÍOS, S. & GONZÁLEZ, J. M., 2011.– A synopsis of the Castniidae (Lepidoptera) of Paraguay.– *Zootaxa*, **3055**: 43-61.
- SCHADE, F., 1925.– Eine Sammelexcursion nach den Bergen von Central-Paraguay.– *Entomologische Rundschau*, **42**(2): 6-7.
- SCHADE, F., 1926.– Jenseits des Towatiry.– *Entomologische Rundschau*, **43**(12): 45-48.
- SCHADE, F., 1927.– Am Serro Pelado.– *Entomologische Rundschau*, **44**(7): 25-26.
- SCHADE, F., 1930.– Im Quellgebiet des Monday.– *Entomologische Rundschau*, **47**(3): 12.
- VINCIGUERRA, R., LOZANO RODRÍGUEZ, P., HERNÁNDEZ-BAZ, F. & GONZÁLEZ, J. M., 2011.– Observations on *Athis thysanete* (Dyar, 1912) (Lepidoptera, Castniidae) from Mexico and comparative notes to other species in the family.– *Biodiversity Journal*, **2**(4): 189-194.

\*J. M. G.  
 California State University, Fresno  
 Department of Plant Sciences  
 Fresno, CA 93740-8033  
 (Research Associate, McGuire Center for  
 Lepidoptera & Biodiversity)  
 EE.UU. / USA  
 E-mail: gonzalez.jorge.m@gmail.com

P. S.  
 Fauna Paraguaya  
 Encarnación, Itapúa  
 PARAGUAY / PARAGUAY  
 E-mail: faunaparaguay@gmail.com

y / and

Para La Tierra  
 Santa Bárbara, San Pedro  
 PARAGUAY / PARAGUAY  
 E-mail: paralatierra@gmail.com

S. D. R.  
Museo Nacional de Historia Natural de Paraguay,  
Sucursal 1 Campus, Central XI, San Lorenzo  
Departamento de Biología, Facultad de Ciencias Exactas y Naturales  
Universidad Nacional de Asunción  
PARAGUAY/ PARAGUAY  
E-mail: sergiord40@gmail.com

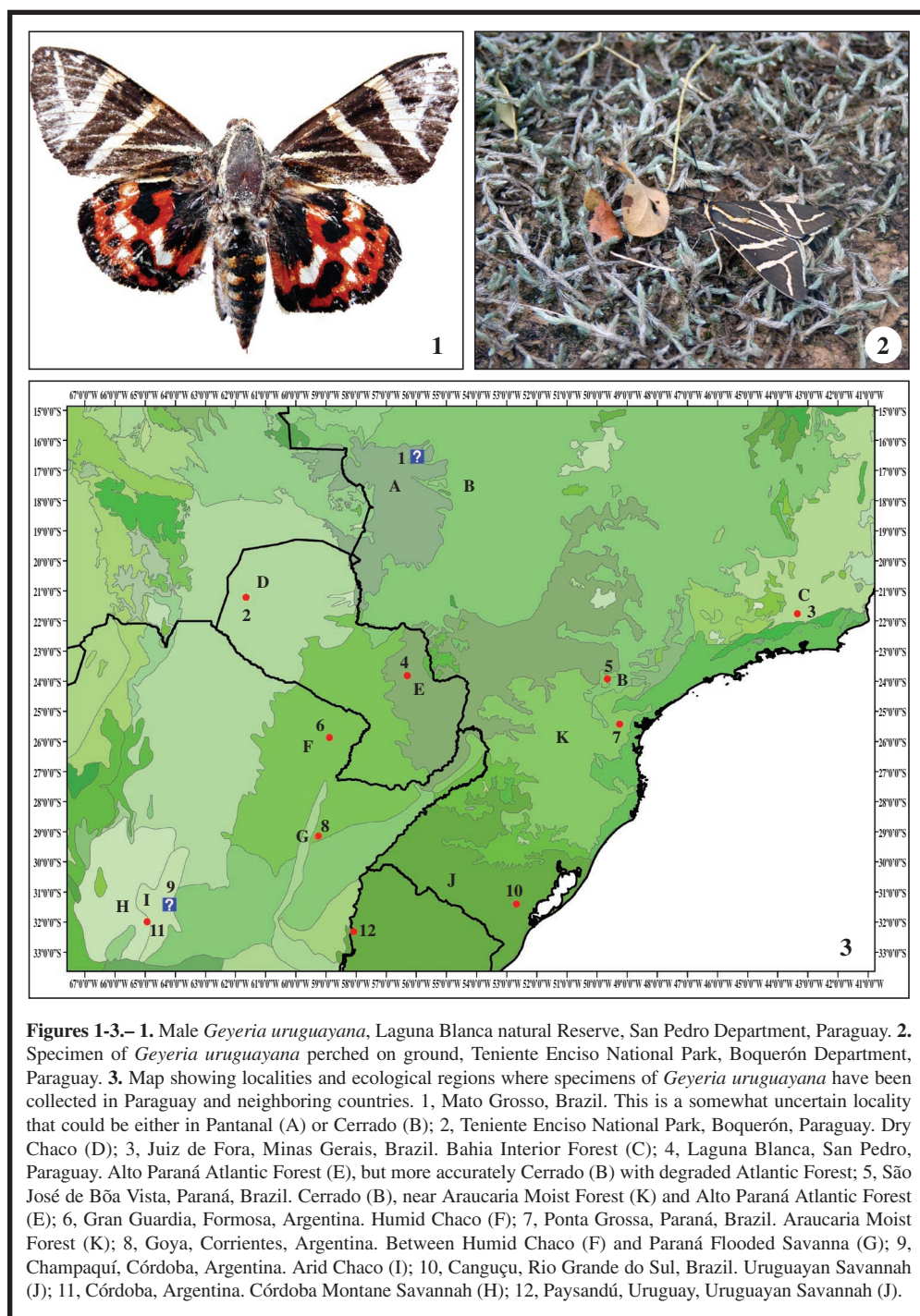
\*Autor para la correspondencia / *Corresponding author*

(Recibido para publicación / *Received for publication* 8-VII-2012)

(Revisado y aceptado / *Revised and accepted* 9-VIII-2012)

(Publicado / *Published* 30-III-2013)





**Figures 1-3.**– 1. Male *Geyeria uruguayana*, Laguna Blanca natural Reserve, San Pedro Department, Paraguay. 2. Specimen of *Geyeria uruguayana* perched on ground, Teniente Enciso National Park, Boquerón Department, Paraguay. 3. Map showing localities and ecological regions where specimens of *Geyeria uruguayana* have been collected in Paraguay and neighboring countries. 1, Mato Grosso, Brazil. This is a somewhat uncertain locality that could be either in Pantanal (A) or Cerrado (B); 2, Teniente Enciso National Park, Boquerón, Paraguay. Dry Chaco (D); 3, Juiz de Fora, Minas Gerais, Brazil. Bahia Interior Forest (C); 4, Laguna Blanca, San Pedro, Paraguay. Alto Paraná Atlantic Forest (E), but more accurately Cerrado (B) with degraded Atlantic Forest; 5, São José de Bóia Vista, Paraná, Brazil. Cerrado (B), near Araucaria Moist Forest (K) and Alto Paraná Atlantic Forest (E); 6, Gran Guardia, Formosa, Argentina. Humid Chaco (F); 7, Ponta Grossa, Paraná, Brazil. Araucaria Moist Forest (K); 8, Goya, Corrientes, Argentina. Between Humid Chaco (F) and Paraná Flooded Savanna (G); 9, Champaquí, Córdoba, Argentina. Arid Chaco (I); 10, Canguçu, Rio Grande do Sul, Brazil. Uruguayan Savannah (J); 11, Córdoba, Argentina. Córdoba Montane Savannah (H); 12, Paysandú, Uruguay, Uruguayan Savannah (J).